Abstract Submitted
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Superconducting proximity effect and the Fermi velocity in the surface-state of SmB_6 thin films[1] SEUNGHUN LEE, XIAOHANG ZHANG, RICHARD L. GREENE, ICHIRO TAKEUCHI, CNAM, MSE, and Physics, University of Maryland — SmB_6 recently has been predicted to be topological Kondo insulator. Here, we investigate the Fermi velocity (v_F) of SmB_6 using transport measurements and a study on the superconducting proximity effect, independently. In the transport measurement, SmB_6 thin films show thickness-independent transport characteristics at low temperatures, which is a strong evidence for the presence of the surface conducting channel as well as the insulting bulk state as the nature of Kondo insulator. We estimate the thickness of the surface-state to be $\approx$ 7 nm and the v_F to be ~10^5 m/s. In order to carry out the proximity effect investigation, we fabricated superconducting Nb/SmB_6 bilayers *in-situ.* We performed Usadel fitting to the variation of critical temperatures of the Nb layers due to the proximity effect. Interestingly, only the fitting regarding a 2D surface model yielded the consistent value of the v_F with the value obtained from the transport measurement as well as the reported value from the quantum oscillation measurement. These results indicate that SmB_6 has a true 2D surface-channel responsible for the observed proximity effect.

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